THE LANCELETS AND LAMPREYS OF AUSTRALIA.

By Gilbert P. Whitley,

Ichthyologist, The Australian Museum, Sydney.

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(Plate xiii.)

In the present paper, the taxonomy of the various species of Australian lancelets and lampreys, the lowest forms of recent fish-like animals, is discussed, and each species is figured, either from typical or authentic specimens. Further research may bring to light new records, or even new species * of these creatures in our waters, and it is the aim of this review to render the recognition of such an easy matter. Our knowledge of the lampreys has not progressed very far since Ogilby wrote his masterly Monograph of the Australian *Marsipobranchii*, published by the Linnean Society of New South Wales in 1896, though the researches of Dr. Maskell in New Zealand indicate that perhaps the forms here regarded as *Yarra* may be immature *Geotria*.

Phylum Chordata.

Subphylum Cephalochordata.

Class Leptocardii (The Lancelets).

Order Branchiostomi.

(Amphioxi, Myelozoa, Cirrostomi, and Protochordata of authors.)

Family Branchiostomidae.

Gonads in two rows. Sympodium ("ventral fin") rayed. Dorsal fin not elevated. Anterior and posterior ends of notochord not produced into a rostrum and urostyle respectively.

Genus Branchiostoma Costa, 1834.

Branchiostoma Costa, Ann. Zool. (Cenni Zool.), 1834, 49. Haplotype, *B. lubricus* Costa = *Limax lanceolatus* Pallas, Spic. Zool., x., 1774, 19, pl. i., fig. 11.

Amphioxus Yarrell, Hist. Brit. Fish., ii., 1836, 468; ed. 2, 1841, 618. Haplotype, *Limax lanceolatus* Pallas.

Amphyoxus Bonaparte, Fauna Ital., iii., 1841, Intro., *pag. extrema* (*fide* Sherborn, Index Anim.). Type, *Limax lanceolatus* Pallas.

Amphioxys Agassiz, Nomencl. Zool., 1846, Index Univ., 18. Emendation for *Amphioxus* Yarrell, 1836. Logotype, *Limax lanceolatus* Pallas, by present designation.

The type-species of this genus is European and not strictly congeneric with the Australian form with symmetrical gonads, which may be defined as a distinct subgenus.

Amphipleurichthys, new subgenus.

Orthotype, *Branchiostoma* (*Amphipleurichthys*) *minucauda*, new species.

Form more elongate and less robust than in *Branchiostoma* and with the myotomes more acutely tapering at each end of the animal. Rostral fin distinguished from the low dorsal fin by a definite notch. Caudal fin reduced to a low fold. Gonads in two lateral series. Epipleura continuous with sides of oral hood and ceasing posteriorly just behind atriopore. Oral

* Whilst this paper was in the press, Franz's description of a new *Bathyamphioxus* came to hand (see page 260, under *Epigonichthys*).

tentacles united by a low web. Sympodium rayed, distinct from epipleura. Snout and tail not produced.

BRANCHIOSTOMA (AMPHIPLEURICHTHYS) MINUCAUDA, new species.

Small-tailed Lancelet.

(Plate xiii., fig. 1.)

Branchiostoma belcheri Günther, Rept. Zool. Coll. Alert, August 1, 1884, 32 (Prince of Wales Island, Torres Strait, Queensland). Not *Amphioxus belcheri* Gray, Proc. Zool. Soc. Lond., pt. xv., May 17, 1847, 35, from Lundu River, Borneo; redescribed by Kirkaldy, Quart. Journ. Micr. Sci., xxxvii., 1895, 313, pl. xxxv., fig. 8.

Branchiostoma belcheri Raff, Zool. Res. Endeavour, pt. iii., 1912, 305. *Id.* Ogilby, Mem. Qld. Mus., v., 1916, 72. *Id.* Hubbs, Occas. Pap. Mus. Zool. Univ. Mich., cv., 1922, 6. Not *Amphioxus belcheri* Gray.

Amphioxus belcheri Willey, Zool. Res., vi., 1902, 724, footnote (Moreton Bay record only). Not *A. belcheri* Gray.

Heteropleuron belcheri Haswell, Rec. Austr. Mus., vii., March, 1908, 35. Not *Amphioxus belcheri* Gray.

Branchiostoma belcheri McCulloch & Whitley, Mem. Qld. Mus., viii., 1925, 127. *Id.* McCulloch, Austr. Mus. Mem., v., 1929, 1. Not *Amphioxus belcheri* Gray.

Myotomes 37 + 14 + 12 = 63. Agrees in general characters with Kirkaldy's figure of *Branchiostoma belcheri* (Gray), but has the caudal fine reduced to a low fold. The number of gonads is difficult to distinguish as some are missing, but the eighteenth pair occurs below the 28th myotome and there appear to be six or seven behind them. Other characters as in subgeneric definition.

The holotype of this species is a specimen 44 mm. in total length dredged in Port Curtis, Queensland, in December, 1929, by Messrs. Melbourne Ward and William Boardman. Australian Museum, registered No. IA 4190.

Amphioxus belcheri Gray, is a briefly described Bornean species, which has been recorded from Queensland by Günther. Kirkaldy described and figured the species in her excellent revision of lancelets, from which the Queensland form is seen to differ notably in having much reduced caudal fin. Jordan and Snyder (Proc. U.S. Nat. Mus., xxiii., 1901, 727) have wrongly recorded this species from Bass Strait. See also *infra*, p. 264.

Family EPIGONICHTHYIDAE.

Lancelets with a single row of gonads developed on the right epipleuron. Snout and tail not produced or attenuated.

BATHYAMPHIOXUS, new genus.

Orthotype, *Asymmetron australis* Raff.

Gonads uniserial, large. Myotomes less than 60. Body deep anteriorly. Sympodium rayed. Rostral fin separated from the dorsal by a small notch. Dorsal fin-rays extending to beyond level of anus. Caudal sagittiform.

This genus also includes *B. franzi*, nov., from W. Australia (see p. 260).

BATHYAMPHIOXUS AUSTRALIS (Raff).

Deepwater Lancelet.

(Plate xiii., fig. 2.)

Asymetron sp. Zietz, Trans. Roy. Soc. S. Austr., xxxii., 1908, 288. Forty miles east of Cape Spencer, South Australia; 100 fathoms.

Asymmetron australis Raff, Zool. Res. Endeavour, pt. iii., August 29, 1912, 303, pl. xxxvii. South of St. Francis Island, Great Australian Bight; 35 fathoms. Paratypes in Australian Museum examined.

Epigonichthys australis Waite, Rec. S. Austr. Mus., ii., 1921, 8, and Fish. S. Austr., 1923, 18, and of later authors.

This species has been well described by Raff, but a new figure of it is here given, prepared from a paratype in the Australian Museum, from south of St. Francis Island, Great Australian Bight. Registered No. IA 4946.

Genus Paramphioxus Haeckel, 1893.

Paramphioxus Haeckel, Zool. Forschungs. Austr. (Semon), i., 1893, xiii. and xv. Haplotype, *Branchiostoma bassanum* Günther, 1884.

Heteropleuron Kirkaldy, Rept. 64th meet. Brit. Assn. Adv. Sci., 1894, 686. Logotype, *Branchiostoma bassanum* Günther, by present designation. *Id.* Kirkaldy, Quart. Journ. Micr. Sci., xxxvii., 1895, 314.

Dorsal fin low and separated from the rostral fin by a notch. Right epipleural fold continuous with sympodium. Seventy or more myotomes.

The generic name *Heteropleuron* was first proposed in 1894 by Kirkaldy in a short paper to which she refers in a footnote in her better known 1895 revision. Hubbs in 1922 selected *H. cingalense* Kirkaldy, 1895, as logotype, but, though that species was described in the earlier paper as *H. singalense*, I am following custom in regarding *Branchiostoma bassanum* as the genotype of *Heteropleuron* Kirkaldy, 1894, thus making it a synonym of *Paramphioxus* Haeckel, 1893.

Paramphioxus bassanus (Günther).

Southern Lancelet.

(Plate xiii., fig. 3.)

Branchiostoma lanceolatum Günther, Cat. Fish. Brit. Mus., viii., 1870, 513 (Bass Strait specimens only). Not *Limax lanceolatus* Pallas, 1774. *Id.* Johnston, Proc. Roy. Soc. Tasm., 1882, 141 and 1890, 39. *Id.* Lucas, Proc. Roy. Soc. Vict. (2), ii., 1890, 47 (Port Phillip and Westernport, Victoria).

Branchiostoma bassanum Günther, Rept. Zool. Coll. Alert, August 1, 1884, 31. Bass Strait [10-12 fathoms; H.M.S. "Herald"]. New name for *B. lanceolatum* Günther, *non* Pallas. Types in British Museum. *Id.* Ogilby, Proc. Linn. Soc. N.S. Wales, x., 1886, 695 (off North Head, Port Jackson, N.S. Wales).

Branchiostoma (*Heteropleuron*) *bassanum* Kirkaldy, Quart. Journ. Micr. Sci., xxxvii., March, 1895, 314, pl. xxxiv., fig. 6.

Amphioxus sp. Sayce, Vict. Nat., xviii., 10, 1902, 152. Living with worm in Westernport, Victoria.

Heteropleuron bassanum Willey, Zool. Res., vi., 1902, 725, footnote. *Id.* Haswell, Rec. Austr. Mus., vii., March, 1908, 34.

Heteropleuron (*Paramphioxus*) *bassanus* Lönnberg, Thier-Reichs (Bronn), vi., 1, 1905, 242.

Asymmetron bassanum Morris & Raff, Proc. Roy. Soc. Vict. (n.s.), xxii., 1909, 85, pls. xviii.-xx. *Id.* Raff, Zool. Res. Endeavour, pt. iii., 1912, 303, pl. xxxvii., fig. 2 (N.S. Wales to South Australia). *Id.* Flynn, Tas. Nat., ii., 3, 1910, 58 (Schouten's Island, south-east Tasmania).

Epigonichthys bassanus McCulloch, Austr. Zool., i., 7, 1919, 218, fig. 1a, and of later authors.

Kirkaldy noted "Myotomes, maximum number 78, minimum number 70, usual number 75." The large number of myotomes readily distinguishes this species from the other Australian lancelets. Morris and Raff further characterise this species by the possession of a paired postatrioporal caecum.

I have examined specimens in the Australian Museum from the following localities: Port Phillip, Victoria (Bracebridge Wilson, Haswell); east coast of Flinders Island and East Sister Island, Bass Strait ("Endeavour"); Port Stephens (Old Collection), Shoalhaven Bight ("Endeavour"), and Montague Island, New South Wales (Hedley). Surface to seven fathoms or more.

MERSCALPELLUS, new genus.

Orthotype, *Heteropleuron hedleyi* Haswell, 1908.

Notochord extending a short distance beyond the myomeres anteriorly and posteriorly, but not forming a club-shaped terminal or a urostyle. Rostral fin not distinguished from the dorsal fin by a notch. Preoral tentacles forming a continuous series. Dorsal fin low, its rays becoming obsolete before the vertical of the anus. Less than sixty myotomes. Rays of sympodium obsolescent. Caudal fin slightly elevated above and below, not attenuated beyond notochord.

MERSCALPELLUS HEDLEYI (Haswell).

Hedley's Lancelet.

(Plate xiii., fig. 5.)

Heteropleuron hedleyi Haswell, Rec. Austr. Mus., vii., 1, March 9, 1908, 33, fig. 1. Murray Island, Queensland; 5-8 fathoms. *Id.* Raff, Zool. Res. Endeavour, pt. iii., 1912, 305.

Epigonichthys hedleyi Ogilby, Mem. Qld. Mus., v., 1916, 72, and of authors. *Id.* Whitley, Rec. Austr. Mus., xvi., 1927, 3 (Michaelmas Cay, Qld.; 2 fathoms).

Myotomes 33 + 11 + 10 = 54. Gonads 19. Oral cirrhi 25-30. Velar tentacles 10-12.

Form elongate, compressed, with low dorsal fin and expansive epipleura. Rostral fin confluent with the dorsal, which is rayed as far back as about the fortieth myotome. Preoral tentacles longest below and connected by a broad web. Velar tentacles short. Pharyngeal gill-slits very numerous. Opening of oral hood opposite the fifth myocomma. Atriopore at the base of the thirty-third myotome. Anus on left side at base of forty-fourth myotome. Notochord not club-shaped anteriorly or produced posteriorly. Sympodium continuous with right epipleuron, but not well developed and with only incipient ray-formations. Caudal slightly expanded. Gonads nineteen, in a single row on the right epipleuron.

Described and figured from the lectotype of the species, the better preserved of two co-types, 28 mm. long, in the Australian Museum; registered No. I. 9254. These were collected by the late Charles Hedley and Allan R. McCulloch at Murray Island, Torres Strait, in 5-8 fathoms. Other Queensland specimens are preserved from Port Denison (Rainford), Michaelmas Cay (Iredale and Whitley), Albany Passage (Ward), and Eagle Island, 3 fathoms, 24th July, 1916 (Hedley and Briggs).

Genus EPIGONICHTHYS Peters, 1877.

Epigonichthys Peters, Monatsb. K. Pr. Akad. Wiss. Berlin, 1876 (1877), 325. Haplotype, *E. cultellus* Peters.

Epigonichthys cultellus Peters.

Knife-back Lancelet.

(Plate xiii., fig. 4.)

Epigonichthys cultellus Peters, Monatsb. K. Pr. Akad. Wiss. Berlin, 1876 (1877), 325 and 853, pl. —, figs. 1-5. Peale [*i.e.*, Peel] Island, Moreton Bay, Queensland; 8 fathoms (H.M.S. "Gazelle"), and of modern authors.

Branchiostoma cultellum Günther, Rept. Zool. Coll. Alert, August 1, 1884, 32. Moreton Bay and Thursday Island, Queensland. *Id.* Willey, Amphioxus and Ancest. Vertebr., 1894, 40.

Epigonichthys pulchellus Tenison-Woods, Fish. Fisher. N.S. Wales, 1882, 187 (Moreton Bay, Queensland). *Lapsus calami.*

Amphioxus cultellus Studer, Zool. Forsch. Gazelle, iii., 1889, 263, pl. xix., figs. 1-5 (Moreton Bay and Thursday Island).

Heteropleuron cultellum Haswell, Rec. Austr. Mus., vii., 1908, 35.

Asymmetron cultellum Raff, Zool. Res. Endeavour, i., 3, 1912, 305.

This species, the monotype of the genus, is easily recognised by the elevated dorsal fin and club-shaped anterior expansion of the notochord. Twelve Queensland specimens in the Australian Museum from Moreton Bay (Ogilby), Bowen (Rainford), Torres Strait (Haswell), Albany Passage and Endeavour Strait (Ward). Franz (Fauna Südwest-Australiens, v., 1927, 219-222, 2 figs.) described *Asymmetron cultellus* ? from Shark's Bay, Western Australia, but his account deals with a distinct species, *Bathyamphioxus franzi,* nov.

Family Asymmetrontidae.

Elongate and slender lancelets, with the posterior end of the notochord produced into a long urostyle. The gonads are developed on the right epipleuron, and there is a sexual dimorphism in the form of the rostral and caudal fins.

Notasymmetron, new genus.

Orthotype, *Asymmetron caudatum* Willey.

Size considerably larger than in the American genus *Asymmetron* Andrews, 1893. Origin and termination of dorsal fin farther forward in relation to the myotomes.

Notasymmetron caudatum (Willey).

Long-tailed Lancelet.

(Plate xiii., fig. 6.)

Asymmetron caudatum Willey, Quart. Journ. Micr. Sci., xxxix., 2. August, 1896, 219, pl. xiii., figs. 1-4. Deboyne Group, Louisiade Archipelago. *Id.* Willey, Zool. Res., vi., 1902, 725, fig. 14. *Id.* Whitley, Rec. Austr. Mus., xvi., 1927, 1927, 3 (Michaelmas Cay; field notes), and of most authors.

Epigonichthys caudatus Jordan & Seale, Bull. U.S. Fish. Comm., xxv., 1906, 181. Based on Willey, 1896. *Id.* Fowler, Mem. Bishop Mus., x., 1928, 17.

Asymmetron lucayanum Haswell, Rec. Austr. Mus., vii., 1908, 35 (Murray Island record only). Not *A. lucayanum* Andrews, 1893, from the Bahamas.

This attenuated lancelet is easily recognisable, even in the field, by its long, pointed tail. Specimens collected at Michaelmas Cay had the viscera pinkish in colour, showing through the body wall, and giving the lower parts

of the myocommas a pink tinge. The anus was green, and the eye-spot pink, and there was a row of dark hyphen-like marks on the anterior myotomes.

A specimen, 30 mm. long, collected by Hedley and McCulloch at Murray Island, Torres Strait, in 1907, is here figured. Austr. Mus., registered No. I. 9254.

Subphylum Craniata.

Branch Monorhina (*fide* Professor W. J. Dakin).

Class Marsipobranchii (The Lampreys).

Order Hyperoartia.

Family Geotriidae.

Genus Geotria Gray, 1851.

Geotria Gray, List. Spec. Fish. Brit. Mus., i., Chondropt., pref. July 25, 1851, 137 and 142. Haplotype, *Geotria australis* Gray. *Id.* Gray, Proc. Zool. Soc. Lond., pt. xix., 1851 (published July 26, 1853), 235 and 238.

Geotria australis Gray.

Pouched Lamprey, or Wide-mouthed Lamprey.

(Plate xiii., fig. 7, and text-fig. a (1).)

Petromyzon sp. Grant, Tasm. Journ. Sci., ii., 1846, 392 (Meander River, Tasmania). *Id.* Milligan, Proc. Roy. Soc. V. Diem. Land, i., 1851, 173 and 300 *et ibid.* 1853, 330 (Oyster Cove, etc., Tasmania).

Geotria australis Gray, List. Spec. Fish. Brit. Mus., i., Chondropt., pref. July 25, 1851, 142, pl. ii. "River Inkar pinki, South Australia" = Hobson's Bay (*fide* Castelnau, 1872), or Onkaparinga (*fide* Waite, 1923). Type in British Museum. *Id.* Gray, Proc. Zool. Soc. Lond., 1851 (published July 26, 1853), 239. *Id.* Günther, Cat. Fish. Brit. Mus., viii., 1870, 508. *Id.* Klunzinger, Sitzb. Akad. Wiss. Wien, lxxx., 1, 1879, 429 (King George's Sound, W. Austr.). *Id.* Ogilby, Proc. Linn. Soc. N.S. Wales, xxi., December 22, 1896, 422. *Id.* Dendy & Olliver, Trans. N.Z. Inst., xxxiv., 1902, 147 ("Velasia" stage and metamorphosis). *Id.* Dendy, Rept. 76th meet. Brit. Assn. Adv. Sci., 1906 (1907), 604 (pineal organ). *Id.* Regan, Ann. Mag. Nat. Hist. (8), vii., 1911, 197 (Australian records only). *Id.* Favaro & Mozejko, Tier-Reichs (Bronn), vi., 1, 1913, 534, pl. xxix. *Id.* Leach, Rept. 84th meet. Brit. Assn. Adv. Sci., 1914 (1915), 399, and of authors generally.

Geotria allporti Günther, Proc. Zool. Soc. Lond., June-December, 1871, 675, pl. lxx., Tasmania (Allport). Type in British Museum. Noted by various authors in Proc. Roy. Soc. Tasm., 1865, 77; 1875, 41; 1876, 9; 1881, xxii.; 1882, 141; 1890, 39.

The mouth has a single supraoral lamina and is surrounded by expansive fringes. Labial teeth well separated. A large gular pouch is developed by members of either sex.

Attains a length of 20 inches.

Tasmania, South and South-western Australia; extralimital.

Genus Yarra Castelnau, 1872.

Yarra Castelnau, Proc. Zool. Acclim. Soc. Vict., i., July 15, 1872, 231. Haplotype, *Y. singularis* Castelnau.

Neomordacia Castelnau, Proc. Zool. Acclim. Soc. Vict., i., July 15, 1872, 232. Haplotype, *N. howittii* Castelnau.

YARRA SINGULARIS Castelnau.

Narrow-mouthed Lamprey.

(Plate, xiii., fig. 8, and text-fig. a (2).)

Geotria chilensis Günther, Cat. Fish. Brit. Mus., viii., 1870, 509 (Swan River record only). Not *Velasia chilensis* Gray, 1851, from Chile.

Yarra singularis Castelnau, Proc. Zool. Acclim. Soc. Vict., i., July 15, 1872, 231. Lower Yarra River, Victoria.

Neomordacia howittii Castelnau, Proc. Zool. Acclim. Soc. Vict., i., July 15, 1872, 232. Cape Shanck, Victoria. Type in Paris Museum.

Velasia stenostomus Ogilby, Proc. Linn. Soc. N.S. Wales, xxi., December, 1896, 409. South-eastern and southern Australia, Tasmania, etc. Type-locality hereby designated Victoria. *Id.* Waite, Rec. Austr. Mus., iv., 1902, 179 (Canning River and off Pinjarrah, W. Australia).

Geotria stenostomus Waite, Rec. Austr. Mus., v., 1904, 232.

Geotria stenostoma Regan, Ann. Mag. Nat. Hist. (8), vii., February, 1911, 197 (Australasian records only). *Id.* Alexander, Journ. Proc. Roy. Soc. W. Austr., vi., 1, 1920, 21, and Herbert, *ibid.*, 23-24, pls. vi.-vii. (ascending river). *Id.* Rauther, Tier-Reichs (Bronn), vi., 1, 39, 1924, 682. *Id.* McCulloch, Austr. Mus. Mem., v., 1929, 2.

Mouth area surrounded by only moderately developed fringes, the suctorial disc much narrower than in *Geotria*. A single supraoral lamina. Labial teeth close together. No gular sac. Second dorsal fin separated from the caudal.

Most authors are agreed that *Yarra singularis* and *Neomordacia howittii* are names given by Castelnau to young *Velasia stenostomus* Ogilby, but the first name, being the oldest, must be employed for this species. It is not definitely proven that this nominal species is merely a form of *Geotria australis*, but Dr. Maskell's researches in New Zealand indicate that such may perhaps be the case.

An original figure, taken from Waite's Pinjarrah specimen, which is 22 inches long (Austr. Mus., Registered No. I. 4793), is here given. The species is found in Tasmania, Victoria, South and south-western Australia, and attains a length of nearly two feet.

Family MORDACIIDAE.

"Two distant lateral tuberculigerous laminae developed from the upper arch of the annular cartilage" (Gill, Ogilby).

Genus MORDACIA Gray, 1851.

Mordacia Gray, List. Spec. Fish. Brit. Mus., i., Chondropt., 1851, 137 and 143. Haplotype, *Petromyzon mordax* Richardson.

MORDACIA MORDAX (Richardson).

Short-headed Lamprey.

(Plate xiii., figs. 9 and 10, and text-fig. a (3 and 4).)

Petromyzon mordax Richardson, Zool. Voy. Erebus & Terror, Fish. 1846, 62, pl. xxxviii., figs. 3-6. Seas of Van Diemen's Land. Type in British Museum.

Mordacia mordax Gray, List. Spec. Fish. Brit. Mus., i., Chondropt., 1851, 144. *Id.* Ogilby, Proc. Linn. Soc. N.S. Wales, xxi., 1896, 400, and of most authors.

Mordacia sp. Stephens, Abstr. Proc. Linn. Soc. N.S. Wales, May 26, 1886, iv. (Camden, N.S. Wales). Specimen in Macleay Museum, University of Sydney.

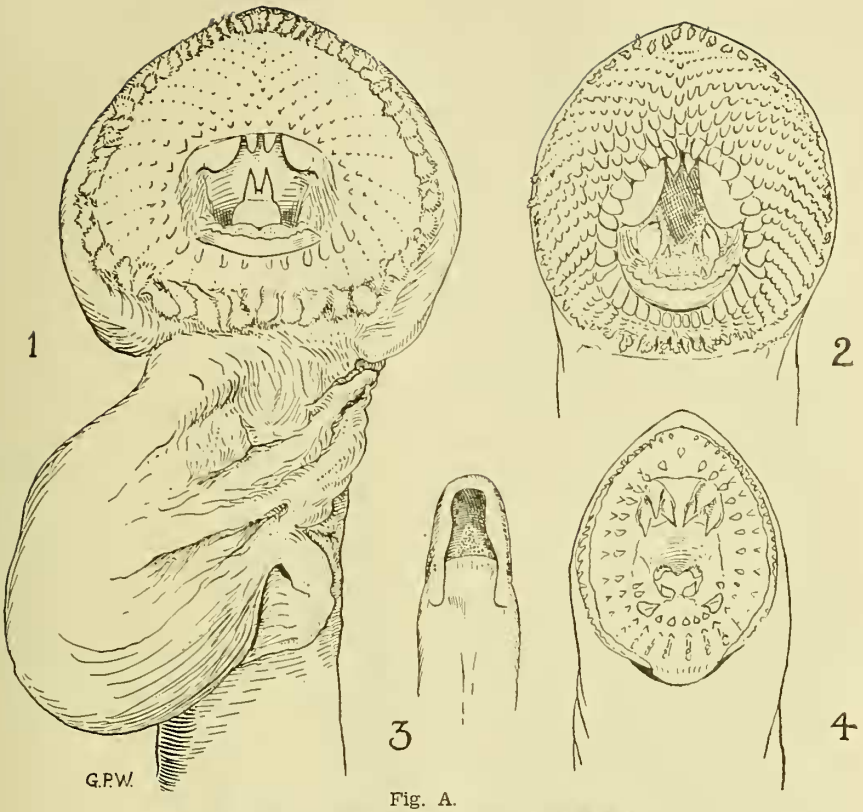

Fig. A.

Suctorial Discs of Australian Lampreys.

1. *Geotria australis* Gray, from Tasmania (Austr. Mus., Regd. No. I. 9830).
2. *Yarra singularis* Castelnau, from Torrens River, near Adelaide, South Australia (I. 15).
3. *Mordacia mordax* (Richardson). Ammocoetal specimen from Prospect, N.S. Wales (IA. 4951).
4. *Mordacia mordax* (Richardson). Adult specimen from Renmark, South Australia (IA. 2539).

Caragola mordax Waite, Rec. S. Austr. Mus., ii., 1, 1921, 9, fig. 4; Fish. S. Austr., 1923, 20 and fig. *Id.* McCulloch, Austr. Mus. Mem., v., 1929, 3.

Fringes around mouth absent or vestigial. No gular sac. Two supra-oral plates, each bearing about three teeth.

This species is occasionally caught in the Murray River system and gives rise to much needless argument as to the presence or absence of "eels" in that river. The older writers mention is as always being common,

but such is apparently not the case nowadays. In a letter dated 18th December, 1925, Mr. W. S. Coombe, of Renmark, South Australia, stated: "The foreman in charge of the local pumping station informs me that they are very common at the time of the first irrigation in October, but fewer are seen later on during the summer season. The first irrigation began on October 13th this year and then they were very plentiful; now they are not so numerous."

This species grows to a length of about eighteen inches and is found in Tasmania, Victoria, South Australia, and, occasionally, in New South Wales rivers. A young specimen caught with others in the water-pipes of Prospect Reservoir, near Sydney, is here figured to show the eyeless, toothless ammocoetal form.

ADDENDUM.

The New Zealand Lancelet.—From the North Island of New Zealand, Benham (Trans. N.Z. Inst., xxxiii., July, 1901, 121, pl. i.), described *Heteropleuron hectori*, which is typical of *Zeamphioxus*, a new genus allied to *Paramphioxus*, but with more than 80 myotomes, rostral fin sagittiform and caudal fin lanceolate, expanding about midway between atriopore and anus. The fin-ray boxes extend to the end of the fins, though they are unoccupied posteriorly and along the sympodium of *Zeamphioxus hectori*.

The Chinese Lancelet, which forms the basis of a fishery at Amoy, has been identified as *Branchiostoma belcheri* ?, by A. M. Boring and Hui-lin Li (Peking Nat. Hist. Bull., vi., March, 1932, p. 9, and figs.), but topotypes of *Amphioxus belcheri* Gray, from Borneo, require figuring for comparison, Kirkaldy's best specimens obviously being Queensland forms (*B. (Amphipleurichthys) minucauda, supra*, p. 257).—G.P.W., September, 1932.

EXPLANATION OF PLATE XIII.

Fig.

1. *Branchiostoma (Amphipleurichthys) minucauda* Whitley. Port Curtis, Queensland. Type, 44 mm. long. Austr. Mus., regd. No. IA. 4190.
2. *Bathyamphioxus australis* (Raff). South of St. Francis Island, Great Australian Bight; 35 fathoms. Paratype, 26 mm. No. IA. 4946.
3. *Paramphioxus bassanus* (Günther). Bass Strait. Topotype, up to 43 mm. After Kirkaldy, 1895.
4. *Epigonichthys cultellus* Peters. Torres Strait, Queensland. A specimen 35 mm. or less in length. After Kirkaldy, 1895.
5. *Merscalpellus hedleyi* (Haswell). Murray Island, Queensland. Lectotype, 28 mm. Austr. Mus. Regd. No. I. 9254.
6. *Notasymmetron caudatum* (Willey). Murray Island, Queensland. A specimen 30 mm. long. Austr. Mus., Regd. No. I. 9253.
7. *Geotria australis* Gray. South Australia. Type, 20 inches long. After Gray, 1851.
8. *Yarra singularis* Castelnau. Pinjarrah, Western Australia. A specimen 22 inches long. Austr. Mus. Regd. No. I. 4793.
9. *Mordacia mordax* (Richardson). Tasmania. Type, 10½ inches. After Richardson, 1846.
10. *Mordacia mordax* (Richardson). Prospect Reservoir, New South Wales. Ammocoetal specimen, 79 mm. long. Austr. Mus. Regd. No. IA. 2689.

All original drawings unless otherwise stated; in the lancelets (figs. 2-5) the gonads of the right side are depicted as showing through the body.